

In the Drawings

A replacement sheet that includes Figure 1B of the Drawings is enclosed.

Remarks

I. RESTRICTION REQUIREMENT

The applicants traverse the finality of the restriction requirement on the grounds that the Examiner's rationale for the distinction between Invention I and Invention II set forth in the official action dated 2 May 2005 should have been presented in the previous official action.

II. DRAWINGS

The drawings are objected to under 37 CFR § 1.83(a) on the grounds that they do not show every feature of the invention specified in the claims. The official action indicates that a light source, and length and pitch as recited in claims 1, 13 must be shown. The applicants enclose a replacement sheet that includes Figure 1B of the Drawings. The applicants have amended Figure 1B to show the pitch p and length l of GRIN element 12.

The applicants have additionally amended paragraph [0016] to make it consistent with amended Figure 1B. The applicants have changed "the length of GRIN element 12" to "the length l of GRIN element 12". The pitch p of GRIN element 12 is already referred to in paragraph [0018]. Additionally, the applicants respectfully point out that the length l of GRIN element 12 is already shown in Figures 3A-3D and is referred to the description of these Figures in paragraphs [0021]-[0025].

The amendments to Figure 1B and paragraph [0016] add no new matter to the application.

With reference to the requirement that the drawings be amended to show a light source, the applicants respectfully point out that Figures 1A, 1B and 3A-3D show what is described as "a light-emitting semiconductor die" at 14. The applicants respectfully submit that, since element 14 is described as "light emitting," a light source is shown in the drawings as originally filed. Nevertheless, to avoid confusion, the applicants have amended Claims 1 and 13 to recite "a semiconductor light-emitting die". As noted above, a semiconductor light-emitting die is shown at 14 in Figures 1A, 1B and 3A-3D of the drawings, and a semiconductor die is shown at 120 as part of various embodiments of an LED in Figures 4A-4D, 5A-5C, 6A-6C, 7A-7D and 8A-8D. The applicants have additionally made corresponding amendments to the claims that depend on

Claims 1 and 13, respectively.

The applicants respectfully submit that the application as now amended complies with 37 CFR § 1.83(a).

III. CLAIM REJECTIONS UNDER 35 USC § 103(a)

Claim 1 and Claim 13

Claim 1 and Claim 13 are rejected under 35 USC § 103(a) as being unpatentable over United States patent no. 5,814,524 of Walt et al. (*Walt*) in view of United States patent no. 5,815,318 of Dempewolf et al. (*Dempewolf*). The applicants traverse the rejection on the grounds that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143.

The applicants respectfully submit that the rejections of Claim 1 and Claim 13 are improper because the proposed combination of references does not disclose all the claim limitations. Walt discloses an optical sensor apparatus for far-field viewing and for making optical analytical measurements at remote locations. Walt's device is composed of a pre-formed unitary fiber optic array arranged in tandem with a GRIN lens.

The official action states that Walt discloses "a fiber optic array serves as a light source." The applicants respectfully submit that Walt's fiber optic array cannot accurately be described as "a light source" because Walt's fiber optic array merely conveys light from one point to another, but is not a *source* of light. With respect to the fiber optic array, Walt states at col. 11, lines 20-27: "The entirety of the construction for the unitary imaging optical fiber array ... provides a means of introducing light energy photons of any determinable wavelength at one specific position on one optic array surface; and then be able to predict accurately the spatial position of the light energy exiting at the other optic array surface." Thus, Walt clearly indicates that his fiber optic array conveys existing light from one optic array surface to the other optic array surface one end. The applicants have been unable to find anything in Walt's disclosure that teaches or suggests that Walt's fiber optic array is a source of light, i.e., is a generator of light or is a point of origin of light, and could therefore be accurately described as a "light source."

To remove doubt with respect to this point, the applicants have amended Claim 1 and

Claim 13 each to recite “a semiconductor light-emitting die.” The applicants respectfully submit that there is nothing in Walt’s disclosure that teaches or suggests that his apparatus could comprise a semiconductor light-emitting die. Moreover, the applicants respectfully submit that it would be impermissible to modify Walt’s optical sensor apparatus to replace Walt’s preformed unitary fiber optic array with a semiconductor light-emitting die since to do so would render Walt’s optical sensor apparatus inoperable for its stated purpose.

The official action additionally states that Walt discloses a GRIN element ... emitting light from the second end surface in a radiation pattern dependent on the length-to-pitch ratio. The applicants have been unable to find this teaching in the cited passage of Walt’s disclosure. Walt’s GRIN is used as an imaging element. At col. 12, lines 36-39, Walt states: “Different GRIN lenses provide a variety of different fractional pitches; and thus the distance for far-field viewing and imaging is preselected by the choice of the fractional pitch for the lens.” The applicants respectfully submit that this passage refers to the dependence of the GRIN lens’ imaging properties on its fractional pitch (Walt’s term of length-to-pitch ratio). The applicants have been unable to find any teaching in the quoted sentence of Walt’s disclosure or elsewhere in the cited passage of Walt’s disclosure with regard to the dependence of the *radiation pattern* of light emitted from the GRIN lens on the fractional pitch. Accordingly, the applicants respectfully submit that the proposed combination of references does not teach or suggest “the GRIN element arranged with the first end surface adjacent the light-emitting die to receive light therefrom and emitting the light from the second end surface in a radiation pattern dependent on the length-to-pitch ratio,” as recited in Claim 1 as now amended. Additionally, the applicants respectfully submit that the proposed combination of references does not teach or suggest “arranging the GRIN element with the first end surface thereof adjacent the light-emitting die to receive light therefrom, the GRIN element emitting the light from the second end surface in a radiation pattern that depends on the length-to-pitch ratio,” as recited in Claim 13 as now amended.

The official action admits that Walt does not disclose the refractive index is substantially constant axially and looks to Dempewolf for a disclosure of the missing element, citing col. 3, lines 5-6 and Figure 2a of Dempewolf’s disclosure. The cited passage of Dempewolf’s disclosure states “Axial gradient index of refraction lenses, sometimes referred to in the prior art as GRIN

lenses, are flat glass slabs.” The applicants respectfully submit that there nothing in the cited passage of Dempewolf’s disclosure that teaches or suggests that “a cylindrical refractive index profile in which the refractive index varies radially and *is substantially constant axially*.” On the contrary, the term “axial *gradient* index of refraction” indicates that the index of refraction *varies* axially. Accordingly, the applicants respectfully submit that the cited passage of Dempewolf’s disclosure teaches away from the proposed modification. The applicants have been unable to find anything in Dempewolf’s Figure 2a that teaches or suggests that the refractive index of the device shown therein *is substantially constant axially* as recited in Claim 1 and Claim 13.

Accordingly, the applicants respectfully submit that the proposed combination of references does not teach or suggest all the claim limitations recited in Claim 1 or in Claim 13.

The applicants additionally submit that that the rejections of Claim 1 and Claim 13 are improper because the proposed combination of references is improper. The official action states:

[I]t would have been obvious to one of ordinary skill in the art to form the Walt et al.’s device having the refractive index is substantially constant axially such as taught by Dempewolf et al. in order to maximize the focused light beams.

The applicants respectfully submit that the rationale set forth in the official action for combining the references does not meet the requirements set forth in MPEP § 2143 for establishing a prima facie of obviousness. The official action does not indicate where in the cited references may be found a teaching or suggestion that “having the refractive index is substantially constant axially in order to maximize the focused light beams.” Moreover, the official action does not indicate where in the cited references may be found a teaching or suggestion that “[maximizing] the focused light beams” is in any way desirable. The applicants have been unable to find such teaching in the cited references. The applicants have not even been able to find any reference to “maximizing” in either of the references. Without a teaching or suggestion in the cited references that would provide the motivation for the person of ordinary skill in the art to make the proposed combination, the proposed combination of references is improper.

Additionally, the official action does not indicate where in the in the cited references may be found a teaching or suggestion that would provide the person of ordinary skill in the art with a reasonable expectation of success in the event such person were to attempt to make the proposed

modification.

Accordingly, since the official action does not set forth a motivation to combine the references that complies with the requirements set forth in MPEP § 2143 and because the official action does not indicate where the cited reference provide a teaching or suggestion that would provide a reasonable expectation of success, as required by MPEP § 2143, the applicants respectfully submit that proposed combination of references is improper, and the rejections of Claim 1 and Claim 13 are improper as a result. The applicants therefore respectfully submit that Claim 1 and Claim 13 are patentable.

The applicants further submit that Claims 2-11 that depend on Claim 1, and Claims 14-22 that depend on Claim 13 are also patentable because of their dependence on allowable independent claims.

Claim 2

Claim 2 is rejected under 35 USC § 103(a) as being unpatentable over Walt in view of Dempewolf and further in view of United States patent application publication no. 2003/0081897 of Itoh et al. (*Itoh*). The applicants traverse the rejection on the grounds that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143.

The official action admits that the proposed combination of Walt and Dempewolf does not disclose the length to pitch ratio is equal to one fourth and looks to Itoh for a disclosure of the missing element. The official action states:

[I]t would have been obvious to one of ordinary skill in the art to form the Walt et al. and Dempewolf et al.'s device having the length to pitch ratio is equal to one fourth such as taught by Itoh et al. in order to maximize the focused light beams.

First, the applicants respectfully submit that the rejection of Claim 2 is improper because the combination of Walt and Dempewolf on which it is based is improper for the reasons set forth above with reference to Claim 1. Additionally, the applicants respectfully submit that the motivation set forth in the official action for additionally combining Itoh with Walt and Dempewolf does not meet the requirements set forth in MPEP § 2143 for establishing a prima facie case of obviousness. The official action does not indicate where in the cited references may

be found a teaching or suggestion of “having the length to pitch ratio is equal to one fourth in order to maximize the focused light beams.” Moreover, the official action does not indicate where in the cited references may be found a teaching or suggestion that “[maximizing] the focused light beams” is in any way desirable. The applicants have been unable to find such teaching in the cited references. The applicants have not even been able to find any reference to maximizing in any of the references. Without a teaching or suggestion in the cited references that would provide a motivation for the person of ordinary skill in the art to make the proposed combination, the proposed combination is improper.

Additionally, the official action does not indicate where in the in the cited references may be found a teaching or suggestion that would provide the person of ordinary skill in the art with a reasonable expectation of success in the event such person were to attempt to make the proposed modification.

Accordingly, because the official action does not set forth a reason to combine the references that complies with the requirements set forth in MPEP § 2143 and because the official action does not indicate where the cited reference provide a teaching or suggestion that would provide a reasonable expectation of success, as required by MPEP § 2143, the applicants respectfully submit that proposed combination of references is improper, and the rejection of Claim 2 is improper as a result. The applicants therefore respectfully submit that Claim 2 is patentable.

Claim 10 and Claim 22

Claim 10 and Claim 22 are rejected under 35 USC § 103(a) as being unpatentable over Walt in view of Dempewolf and further in view of United States patent application publication no. 2002/0122638 of Wang et al. (*Wang*). The applicants traverse the rejection on the grounds that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143.

The official action admits that the proposed combination of Walt and Dempewolf does not disclose the light emitting device additionally comprises a header; the header comprises a cavity extending thereinto; the light source is mounted in the cavity defined in the header, and the

GRIN element is engaged with the cavity and looks to Wang for a disclosure of the missing elements.

The applicants respectfully submit that the rejections of Claim 10 and Claim 22 are improper because the proposed combination of references does not disclose all the claim limitations. Claim 10 recites in part: “the light-emitting device additionally comprises a header; the header comprises a cavity extending thereinto.” Claim 22 recites in part: “providing a header, the header defining a cavity.” The official action alleges that Wang discloses “a support member 14 serves as a header wherein the support member 14 comprises a cavity extending thereinto.” The applicants respectfully disagree. Wang does not disclose “the header comprises a cavity extending thereinto” or “a header, the header defining a cavity,” because Wang’s support member 14 lacks any element that can accurately be called a “cavity.” Instead, Wang’s support member has a through hole that extends from one surface of the support member to the other and in which laser diode 12 is located. Because Wang’s through hole extends all the way through support member 14, it cannot accurately be called a “cavity.”

Additionally, Claim 10 as now amended recites in part: “the light-emitting die is mounted in the cavity defined in the header” and Claim 22 as now amended recites in part: “mounting the light-emitting die in the cavity” The cited passage of Wang’s disclosure describes the optical transmitter module disclosed in United States patent no. 4,969,702 of Anderson. Anderson teaches that laser diode 12 is mounted in a can that in turn is fixedly positioned on support member 14 (col. 2, lines 45-47). Accordingly, the applicants respectfully submit that neither Anderson’s original disclosure nor Wang’s description of Anderson’s device discloses “the light-emitting die is mounted in the cavity defined in the header,” as recited in Claim 10 or “mounting the light-emitting die in the cavity” as recited in Claim 22.

Claim 10 additionally recites in part: “the GRIN element is engaged with the cavity by a push fit.” Anderson discloses that laser diode 12 is secured in support member 14 by epoxy and GRIN lens 16 is attached to the window of laser diode 12, also by epoxy (col. 3, lines 45-65). The applicants respectfully submit that this passage of Anderson’s disclosure cannot accurately be said to disclose “the GRIN element is engaged with the cavity by a push fit,” as recited in Claim 10.

The applicants traverse the assertion set forth in the official action that “a push fit” is a “product by process” element. The term “push fit” is commonly-used in English as a *noun* to denote a type of join between elements. For example, the Encarta dictionary defines “push fit” as “join created by pushing pieces together: a join that enables two pieces to be pushed together rather than fixed in some other way.” The noun “push fit” is used in this sense in Claim 10. Accordingly, the applicants respectfully submit that “the GRIN element is engaged with the cavity by a push fit” is a structural element, not a product-by-process element.

Moreover, even if, for the sake of argument “the GRIN element is engaged with the cavity by a push fit” could properly be regarded as a product-by-process element, Wang’s Figure 1 does not show the structure that would result from the alleged process. Wang’s Figure 1 shows a distinct clearance between GRIN lens 16 and support member 14. Accordingly, the applicants respectfully submit that Wang’s Figure 1 fails to show the result of engaging GRIN lens 16 in the through hole in support member 14 by the alleged push fit process.

Finally, the device shown in Wang’s Figure 1 differs *structurally* from a device in which the GRIN element and the cavity are engaged by a push fit. Wang’s Figure 1 shows a distinct clearance between GRIN lens 16 and support member 14. Accordingly, the applicants respectfully submit that Wang’s Figure 1 fails to show GRIN lens 16 engaged in the through hole in support member 14 by a push fit.

Accordingly, the applicants respectfully submit that the proposed combination of references does not teach or suggest all the claim limitations recited in Claim 10 or in Claim 22.

The applicants additionally submit that the rejections of Claim 10 and Claim 22 are improper because the proposed combination of references is improper. The official action states:

[I]t would have been obvious to one of ordinary skill in the art to form the Walt et al. and Dempewolf et al.’s device having a support member serves as a header wherein the support member comprises a cavity extending thereinto; the light source is mounted in the cavity defined in the support member; and the GRIN element such as taught by Itoh et al. in order to support the light emitting device.

The applicants respectfully submit that the proposed combination of Walt and Dempewolf is improper for the reasons set forth above with reference to Claim 1 and Claim 13. Moreover, the applicants respectfully submit that the additional modification of the proposed combination of Walt and Dempewolf in accordance with the teaching of Itoh/Anderson is

improper because replacing Walt's fiber optic array with Anderson's laser would render Walt's optical sensor apparatus inoperable for its stated purpose. Accordingly, the proposed combination of references is improper.

Moreover, the official action does not indicate where in Walt's disclosure can be found a teaching or suggestion that indicates that the way of supporting the optical fiber array taught in Walt's disclosure is in any way unsatisfactory.

Additionally, the official action does not indicate where in the in the cited references may be found a teaching or suggestion that would provide the person of ordinary skill in the art with a reasonable expectation of success in the event such person were to attempt to make the proposed modification.

Accordingly, since the official action does not set forth a reason to combine the references that complies with the requirements set forth in MPEP § 2143 and because the official action does not indicate where the cited reference provide a teaching or suggestion that would provide a reasonable expectation of success, as required by MPEP § 2143, the applicants respectfully submit that the proposed combination of references is improper, and the rejections of Claim 10 and Claim 22 are improper as a result. The applicants therefore respectfully submit that Claim 10 and Claim 22 are patentable.

Claim 11

Claim 11 is rejected under 35 USC § 103(a) as being unpatentable over Walt in view of Dempewolf and Wang and further in view of United States patent no. 6,263,133 of Hamm. The applicants traverse the rejection on the grounds that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143 for the reasons set forth above with reference to Claim 1 on which Claim 11 depends.

The applicants respectfully request reconsideration of the rejected claims. The applicants believe that the application as now amended is in condition for allowance, and respectfully request such favorable action. If any matters remain outstanding in the application, the Examiner is respectfully invited to telephone the applicants' attorney at (650) 485-3015 so that these matters may be resolved.

Respectfully submitted,
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